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## UNIVERSAL TRACK AND COPING ASSEMBLY FOR POOL COVERS

### Cross Reference to Related Applications

This application claims the benefit under Title 35, U.S.C. § 119(e) of U.S. Provisional Patent Application Serial No. 60/433,441, entitled UNIVERSAL TRACK AND COPING ASSEMBLY FOR POOL COVERS, filed on December 13, 2002.

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention.

[0001] The field of the present invention pertains to tracks and coping for use with swimming pool covers.

#### 2. Description of the Related Art.

[0002] Swimming pool covers are needed to prevent debris from entering the pool, and to heat the pool in the case of a solar cover. A pool cover may reduce chemical usage, as well as provide some safety. An automatic pool cover system allows the cover to be easily extended over the pool during periods of non-use, and retracted during periods of use. A typical automatic pool cover is wound around a reel or tube, which usually is disposed within a cover box at one end of the pool, commonly the deep end. The automatic cover system usually includes a pair of tracks extend along each side wall of the pool. The tracks may be top-mounted to the surface deck or under-mounted to a coping, which is a formed material disposed along the periphery of the pool and above water level.

[0003] A traditional construction of a pool cover includes a cover sheet made of a durable fabric, such as heavy vinyl. Each side edge of the pool cover is normally fastened to a

rope for retaining in the tracks. The rope usually extends the length of the pool and winds around a pulley positioned at the end opposite to the cover box in a continuous loop. The rope defines a first leg sewn into the cover along each side edge and a return leg moving in an opposite direction of the first leg, when the pool cover extends or retracts. Other known constructions of the pool cover include a slider or a lead guide attached to a lead bar adjacent to the first leg, or a webbing reinforcing the edges of the cover sheet. The slider or the lead guide serves to guide the cover within the track. A common pool cover has a leading edge, which may include a leading bar extending across the width of the pool. The leading bar may be locked in place when the cover sheet extends completely and the pool cover is in a closed position.

**[0004]** Extruded copings which are formed from metal, e.g., aluminum are commonly used. An aluminum coping provides advantages such as increased ability to withstand thermal expansion and contraction, resistance to UV radiation, and relatively high strength and rigidity. A coping may include an upright or curved surface attachable to a pool deck, and a slot for receiving a track for holding a pool cover. Although a track may be installed separately from the coping, a track installed within a coping slot is preferred for safety and aesthetic purposes. A coping may also define a slot for receiving a pool liner bead, and may further include a slot for receiving a fiber optic or light emitting source for decorative purposes.

**[0005]** A common track is made of extruded metal such as aluminum. A conventional configuration of a track includes two channels, a front channel for receiving a first leg of a rope fastened to the side edge of a pool cover, and a back channel for receiving a return leg of the rope. Another known configuration of a track includes three channels, a front channel configured to receive a portion of a slider or a "lead guide" for guiding the cover through the

track, a middle channel open into the front channel for receiving the first leg of the rope, and a back channel for receiving the return leg of the rope.

[0006] One problem with the known track and coping combinations is that some coping manufactures provide copings that do not have a slot for receiving the track or copings that have a slot that fits only a certain construction of commercially available track, and not others.

[0007] Another problem is that known track and coping combinations can only be used with few specific constructions of the commercially available pool covers. The two-channel track can only be used with a pool cover having a rope attached to the edges thereof, but without a slide or a guide attached thereto. It is common that this particular construction of the pool cover has a cover sheet that extends between the front channel of a track at one side of the pool and the front channel of another track on the other side of the pool. The three-channel track is commonly used with the pool cover having a slider or a guide attached thereto. Normally three-channel track requires a wider pool cover sheet that is extended from the middle channel of a track at one side of the pool to another middle channel of another track at the other side of the pool. The three channel-track cannot be used with the pool cover made for two-channel tracks unless the cover sheet is wide enough to extend beyond the front channel, configured to receive a slider or a lead guide, to the middle channel for receiving the first leg of the rope. However, this configuration results in increased wear and tear on the cover sheet when the edges rub on the track walls defining the front channel. Similarly, the two-channel track cannot be used with the wider pool cover made for the three-channel track because the cover sheet will sag too much due to its extra width, and the two-channel track cannot accept the slider, because the two-channel track has no third channel.

## SUMMARY OF THE INVENTION

[0008] The present invention provides a universal track and coping assembly for use with different commercially available swimming pool covers or suitable new pool covers. The universal track and coping assembly includes a coping body and a reversible track for retaining side edges of a pool cover. The reversible track is insertable within a slot of the coping body in two orientations. In each orientation, the track is configured to retain or operate a different construction of the pool cover.

[0009] In one aspect of the present invention, the universal track and coping assembly provides a reversible track configured to interlock with the coping body within the coping slot. Once locked inside the coping slot, the reversible track is stably retained within the slot despite the pulling weight of the pool cover.

[0010] In another aspect of the present invention, the universal track and coping assembly includes a coping body defining a slot having a slot opening, an inner wall, and an opposite inner wall. Either one of the inner walls may define a coping tab projecting therefrom. The coping tab interlocks with the reversible track to keep the reversible track from being pulled out of the slot opening.

[0011] In another embodiment, the universal track and coping assembly further includes at least one insert plate or a wedge insertable into the slot, between the reversible track and one of the inner walls of the coping, for keeping the reversible track tightly fit against the other one of the inner walls.

[0012] According to another embodiment, the reversible track further defines two locking ledges positioned such that one of the ledges interlocks with the coping tab to keep the reversible track from sliding out of the slot opening. The locking ledges may include a track tab projecting from an outer surface of the reversible track.

[0013] In a form of the present invention, the reversible track defines a first channel and a second channel for receiving and retaining a rope attached to each edge of the pool cover. A first channel defines a first opening and a second channel defines a second opening. The first and the second openings face opposite directions. When the reversible track is inserted into the coping slot, either the first or the second opening may face in the same direction as the slot opening.

[0014] The second channel of the reversible track may further define a rope passage and a passage opening within the second channel. The passage opening is in communication with the second channel opening. The first channel and the rope passage are configured to receive the rope attached to the pool cover. Either the first channel or the rope passage may receive a first leg of the rope, which is directly associated with the edge of the cover, or the return leg of the rope. The second channel is also configured for receiving a portion of a slider attached to a pool cover.

[0015] In an exemplary embodiment, the universal and coping assembly further includes a pair of pulleys for receiving and changing the direction of the ropes, each attached on each side of the pool cover. Each pulley may reside in a pulley housing attached within the coping slot or on the reversible track. The housing may define a passageway with a passageway opening for receiving the pulley and releasing the pulley from the housing.

[0016] One objective of the present invention is to provide a track and coping assembly that can be easily installed with a pool.

[0017] Another objective of the present invention is to provide a universal track and coping assembly that is compatible with any construction of the commercially available pool covers.

[0018] A further objective is to provide an extruded pool cover track that will consolidate most current extruded pool cover tracks. Use of this track will be for applications on vinyl pools, fiberglass, and many other styles of pools that require a cover track to be placed at or below the deck.

[0019] Other objects of the invention will become apparent upon consideration of the following written description and accompanying figures.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The above-mentioned and other features and objects of this invention, and the manner of attaining them, will become more apparent and the invention itself will be better understood by reference to the following description of an embodiment of the invention taken in conjunction with the accompanying drawings, wherein:

[0021] Figure 1 is a perspective view of a swimming pool having a universal track and coping system of the present invention;

[0022] Figure 2 is a cross sectional view of the universal track and coping assembly of the present invention, showing a first orientation of the reversible track within the coping slot;

[0023] Figure 3 is a cross sectional view of the universal track and coping assembly of the present invention, showing the second orientation of the reversible track within the coping slot;

[0024] Figure 4 is a cross sectional view of a coping of the universal track and coping assembly of the present invention;

[0025] Figure 5 is a cross sectional view of the reversible track of the universal track and coping assembly of the present invention;

[0026] Figure 6 is a cross sectional view of an insert plate of the present invention;

[0027] Figure 7 is a cross sectional view of the first orientation of the reversible track within the coping slot, holding a first construction of a pool cover;

[0028] Figure 8 is a cross sectional view of the second orientation of the reversible track within the coping slot, holding a second construction of a pool cover; and

[0029] Figure 9 is a top elevational view of a pulley according to one embodiment of the present invention.

[0030] Figure 10 is a top perspective view of the pulley housing according to the embodiment in Figure 9.

[0031] Figure 11 is a top perspective view of another pulley housing.

[0032] Corresponding reference characters indicate corresponding parts throughout the several views. Although the drawings represent embodiments of the invention, the drawings are

not necessarily to scale and certain features may be exaggerated or omitted in order to better illustrate and explain the present invention. The exemplifications set out herein illustrate embodiments of the invention, in several forms, and such exemplifications are not intended to be construed as limiting the scope of the invention in any manner.

## DESCRIPTION OF THE INVENTION

**[0033]** The embodiment disclosed below is not intended to be exhaustive or limit the invention to the precise form disclosed in the following detailed description. Rather, the embodiment is chosen and described so that others skilled in the art may utilize its teachings.

**[0034]** As shown in Figure 1, pool 10 is installed with universal track and coping assembly 20 along sidewalls 14 of pool 10. Pool cover 30 has side edges 32 retained in universal track and coping assembly 20. Cover 30 may be extended over pool 10 from first end 11 to second end 12. Pulley 101 may be provided on each of side of pool 10, at second end 12 for directing the direction of a rope (not shown) attached to each of side edges 32. During periods of non-use, cover 30 is retracted to first end 11, and during periods of use, cover 30 is extended to second end 12. First end 11 may be a shallow end or a deep end of the pool, however, typically first end 11 is the deep end. The extension and the retraction of cover 30 may be carried out manually or automatically. In case of an automatic operation of pool cover 30, a motor and reel system (not shown) is provided.

**[0035]** Universal track and coping assembly 20 includes coping 40 affixed along side walls 14 of pool 10. Coping 40 may include top portion 41 disposed along top surface 15 of the sides 14 of pool 10 and integrated with pool deck 13.

**[0036]** As shown in Figures 2-3, universal track and coping assembly 20 includes coping 40 defining slot 42 having reversible track 60 inserted therein. Universal track and coping assembly 20 may also include at least one insert plate 90.

[0037] As depicted in Figure 4, slot 42 of coping 40 is defined by first inner wall 43, second inner wall 44, end wall 45, and slot opening 46. First inner wall 43 defines coping tab 48 projecting towards second inner wall 44. The shape and sizes of slot 42 may vary. For example, as demonstrated in Fig 4, slot 42 is depicted as having a rectangle cross section, having first inner wall 43 positioned on the top side of slot 42, and second inner wall 44 positioned on the bottom side of slot 42. End wall 45 may have a flat surface or an arching surface. Slot 46 may have a depth  $-a-$ , and a height  $-b-$ . As an example, depth  $-a-$  may be about 1 and 7/8 inch, and height  $-b-$  may be about 1.0 inch.

[0038] As further depicted in Figure 4, coping tab 48 is positioned at distance  $-c-$  from end wall 45 of slot 42. As an example, distance  $-c-$  may be about 15/32". Space 49 is created between inner wall 45 and coping tab 48.

[0039] In Figure 5, reversible track 60 defines first head 61 and second head 62. First head 61 defines first channel 64 having opening 65. First head 61 also defines top wall 66 having first ledge 63 projecting from top wall 66. First ledge 63 may be shaped as track tab 67. First head 61 may also define second track tab 68 having front surface 69. Second head 62 is connected to first head 61, having space 82 therebetween. Second head 62 defines top wall 78 and ledge 76 projecting from top wall 78. Second head 62 further defines second channel 70 having second channel opening 71. Second channel 70 may include rope passage 74 having passage opening 75 open toward second channel opening 71.

[0040] Reversible track 60 may be of any suitable size and dimension, provided that it can be insertable and locked within coping slot 42. For example, as shown in Figure 5, reversible track 60 has width  $-a-$  and height  $-b_1-$ . First track tab 67 is positioned at distance  $-c_1-$ .

from outer surface 69 of second track tab 68, and second ledge 76 also is positioned at distance - $c_1$ -from outer surface 80 of second head 62. As an example, width - $a$ - is about 1 and 7/8 inch, height - $b_1$ - is about 3/4 inch, and distance - $c_1$ - is about 7/16 inch.

[0041] Both coping 40 and reversible track 60 may be made of any suitable material, such as extruded aluminum or extruded plastic. Aluminum may withstand thermal expansion and contraction better than plastic. Color may be added for aesthetic purposes. Other metals such as steel and copper may also be used.

[0042] In Figure 6, at least one insert plate 90 is shown. Insert plate 90 may be of any suitable shape and size. For example, at least one insert plate 90 may be a rectangular plate or a wedge. As shown in Figure 6 insert plate 90 is rectangular and has width - $a$ -, and thickness - $d$ -. As an example, width - $a$ - is about 1 and 7/8 inch and thickness - $d$ - is about 1/4 inch. At least one insert plate 90 may be made of any suitable material that can be easily inserted into slot 42 between reversible track 60 and one of inner walls 43-44 and that is rigid enough to keep reversible track 60 interlocked within slot 42. For example, insert plate 90 may be made of rubber or plastic. More than one insert plates may also be used to lock reversible track 60 within coping slot 42.

[0043] Coping 40, reversible track 60, and insert plate 90 may have any suitable length for extending from first end 11 to second end 12 of pool 10 (see Figure 1).

[0044] Figures 2 and 3 demonstrate universal track and coping assembly 20 having reversible track 60 inserted into slot 42 of coping 20 in two orientations. Figure 2 depicts reversible track 60 inserted in slot 42 in a first orientation, having first channel opening 65 faces

back wall 45, and second channel opening 71 faces in the same direction as slot opening 46. First ledge 63 or track tab 67 is interlocked with coping tab 48 within space 49 of slot 42. At least one insert plate 90 is inserted between reversible track 60 and second inner wall 44 of slot 42.

[0045] Figure 3 depicts reversible track 60 inserted in slot 42 in a second orientation, having second channel opening 70 facing back wall 45 of slot 42, and first channel opening 65 facing in the same direction as slot opening 46. Second ledge 76 is interlocked with coping tab 48 within space 49 of slot 42. At least one insert plate 90 is inserted between reversible track 60 and second inner wall 44 of slot 42.

[0046] Figures 7-8 depict universal track and coping assembly 20 disposed at side wall 14 of swimming pool 10 (see Figure 1). Coping 40 may be attached to side wall 14 or pool deck 13 by any suitable fasteners. Cement may be poured around coping 40 such that top portion 41 of coping 40 is integrated with deck 13, and slot 42 of coping 40 projects into each of walls 14, having slot opening 46 flush with an outer surface 16 of each of walls 14.

[0047] In Figure 7, reversible track 60 is inserted in slot 42 in the first orientation, having first head 61 facing back wall 45 of coping 40, and second head 62 facing in the same direction as slot opening 46. Second head 62 defines second channel 70 having rope passage 74 for receiving first construction 18 of pool cover 30. Specific construction 18 may be any commercially available pool cover that has each of side edges thereof attached to a rope. Specific construction 18 includes slider or lead guide 26 attached to pool cover 30. For example, as shown in Figure 7, specific construction 18 includes cover material 34 having each of edges 32 wrapped around rope 36. Rope 36 defines first leg 37 running along the length of cover 34

and return leg 38. First leg 37 may extend beyond the length of cover sheet 34 to wind around pulley 101 disposed at second end 12 of pool 10 (see Figure 1). Pulley 101 may rotate in one direction to pull on first leg 37 while releasing return leg 38 in order to pull cover sheet 34 towards second end 12 of pool 10 for a closing position. Pulley 101 may rotate in an opposite direction to pull on leg 38 while releasing leg 37 when cover sheet 34 retracts for an opening position.

**[0048]** In an exemplary embodiment as shown in Figure 9, pulley 101 resides in pulley housing 102 which may be connected to the coping or the reversible track. Housing 102 may include insert block 107 which is configured to fit into space 82 of reversible track 60 (see Figures 4, 7-8). Housing 102 may define end 105 aligned with the reversible track for receiving rope 36 and open side 104. End 105 may include openings 111 and 110 for receiving return leg 38 and first leg 37, respectively. In a specific embodiment, as shown in Figures 9 and 10, housing 102 further defines passageway 103 communicated with opening 106 for moving pulley 101 in or out of housing 102. When rope 36 is relaxed, pulley 101 may be moved along passageway 103 to be released from housing 102 through opening 106. This passageway feature of housing 102 allows pulley 101 or the rope to be adjusted or replaced easily without having to take apart housing 102.

**[0049]** Shown in Figure 11 is housing 122, which has the same features as housing 102 in Figure 10. However, passageway 113 is open to an opposite side of passageway 103. Housing 102 and Housing 122 may be placed at opposite side walls at the second end of the pool, such that openings 106 and 116 face the pool cover. Each pulley may be removed or inserted through opening 106 or 116.

[0050] Referring again to Figure 8, Slider or lead guide 26 may be attached to cover sheet by any known mechanism. For example, slider or lead guide 26 may have rope duct 27 for receiving a portion of first leg 37 that extends beyond cover sheet 34. In this way, the slider or lead guide 26 is not attached directly onto cover sheet 30, but at leading edge 35 of cover sheet 34 (see Figure 1). Slider or lead guide 26 may also be clamped onto a corner of leading edge 35 by each of side edges 32. When pool cover 30 is extended along pool 10 (see Figure 1), slider or lead guide 26 serves to thread first leg 37 through rope passage 74 of reversible track 60. As shown in Figure 7, a portion of slider or lead guide 26 is received in second channel 70. Return leg 38 of rope 36 is retained in first channel 64.

[0051] In Figure 8, reversible track 60 is inserted in slot 42 in the second orientation, having first head 61 facing in the same direction as slot opening 46, and second head 62 facing back wall 45 of coping 40. First head 61 defines first channel 64. Received therein is second construction 19 of pool cover 30. In alternative construction 19, cover 30 has edges 32, each attached to rope 36. Rope 36 has first leg 37 attached to cover sheet 34, and return leg 38. Alternative construction 19 does not have a slider or lead guide. When pool cover 30 is extended along pool 10 (see Figure 1), first leg 37 is pulled along first channel 64 and return leg 38 is pulled in an opposite direction through rope passage 74.

[0052] In addition to first construction 18 and second construction 19, other traditional constructions of commercially available pool cover may be used with universal track and coping assembly 20 of the present invention. For example some pool covers, although has no slider or lead guide, may have reinforcement material such as a webbing sewn onto the edges of the pool cover sheet. Second channel 70 may be configured to receive such reinforcement material. An

alternative example of other pool covers may include plurality of wheels attached to edges 32 of cover sheet 34. Second channel 70 may receive the plurality of wheels that can be moved along reversible track 60.

[0053] As demonstrated in Figures 7-8, reversible track 60 may be inserted in two orientations, as described above. At least one insert plate 90 keeps reversible track 60 tightly fitted in slot 42 having either first track tab 67 (Figure 7), or second ledge 76 (Figure 8) interlocking with coping tab 48. Reversible track 60 is capable of resisting pulling force from the weight of pool cover 30.

[0054] Universal track and coping assembly 20 of the present invention provides pool installers with a flexibility in using different types of pool covers, without having to purchase or stock up many different combinations of track and copings. Similarly, manufacturers do not need to manufacture, transport, or store different copings and tracks for different constructions of pool covers.

[0055] Although universal track and coping assembly 20 of the present invention should be installed primarily along the side walls of the swimming pool, it can alternatively be installed along the deck of the swimming pool.

[0056] While this invention has been described as having an exemplary design, the present invention may be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the invention using its general principles. Further, this application is intended to cover such departures from

the present disclosure as come within known or customary practice in the art to which this invention pertains.